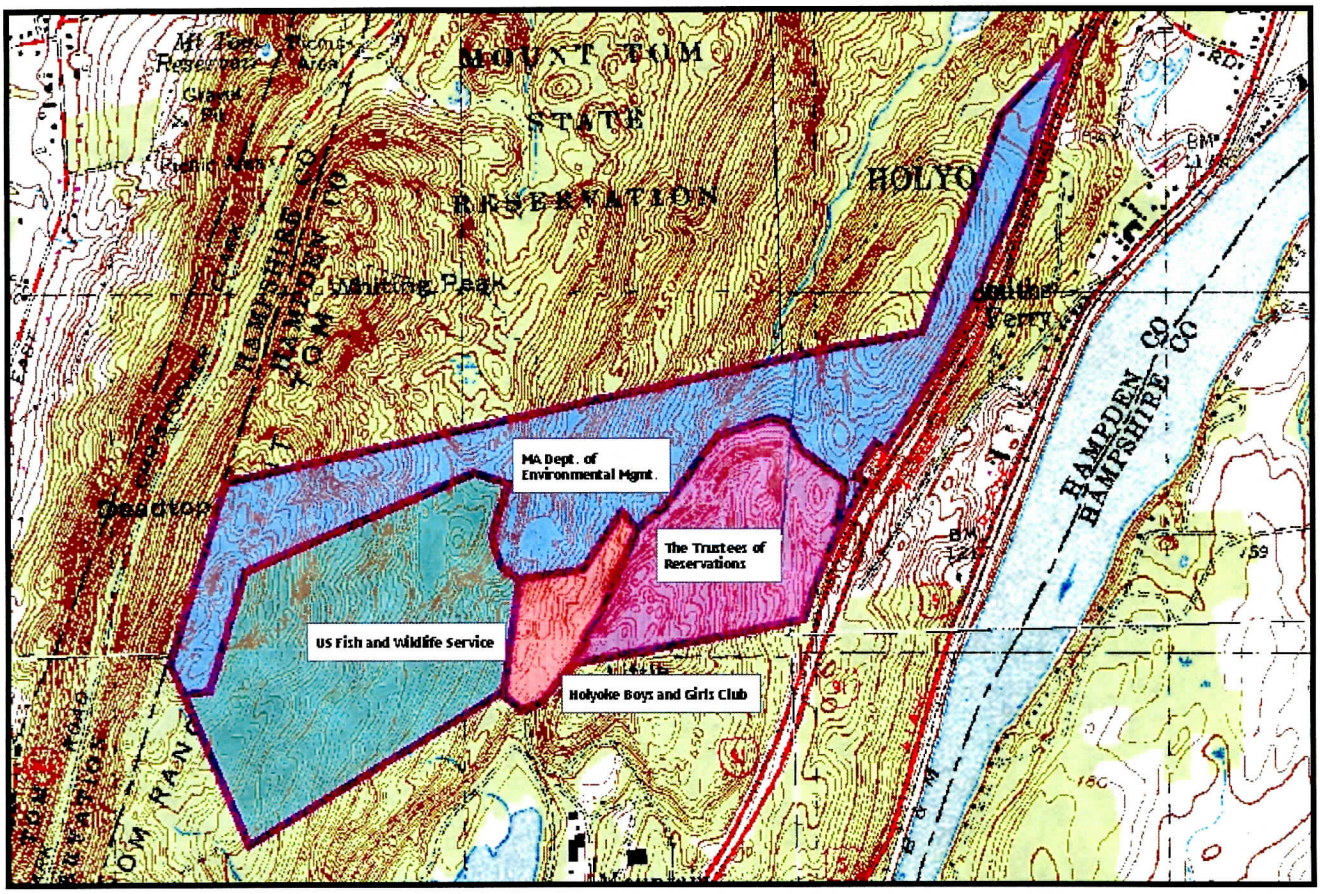
Mount Tom
Survey Summary, 2003



Contents

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Preliminary Recommendations

Breeding Landbirds

- Continue breeding landbird survey in 2005.
- Add bird surveys during migration season in early May to yield more information on the importance of the Mt. Tom properties as stopover habitat.

Reptiles and Amphibians

- Develop an outreach strategy for snakes at Mt Tom that addresses both pedestrian safety concerns as well as conservation measures.
- It is recommended that additional searches be conducted for vernal pools (as time allows), particularly in the area along the ridge to the north of the wind tower, and in the forested wetland to the north of Mountain Park Reservoir. A formal vernal pool survey is not recommended for 2005.
- We don't know much about reptiles and amphibians (other than vernal pool species) in these properties. Investigate any anecdotal records for the state-listed species, and look for the possibility of favored basking sites. There is one MANHESP record that may have been at a den site. Box Turtle was found in two locations in 2003 while doing other surveys, one location near Bray Brook. Wood Turtle is also a possibility.

Invertebrates

- There are several plant species in these properties that are host plants for rare moths and butterflies. A monitoring study for these species might yield some finds.
- MANHESP identifies 14 state-listed odonate species that are associated with major rivers such as the Connecticut River. These species probably use the slopes for foraging after emergence. The Skillet Clubtail (Gomphus ventricosus) was found on one of the ski slopes during the Athol Nature Club trip on 6/21/03. Additional odonate surveys are desirable.

Rare Plants / Priority Plant Communities

- Specify which species require management action – what needs to be done and how often (e.g. population monitoring, control of canopy shading, competition from invasive species). This will require some consultation and probably some careful experiments combined with long-term monitoring.
- Limit trail use to non-mechanized recreational activities like hiking, cross-country skiing, snowshoeing, photography, nature study, etc.
- Lay out trail routes that do not go near rare plant populations and priority plant communities, specifically: Hickory – Hop Hornbeam Forest, Circumneutral Talus Slope, Circumneutral Rock Outcrop, Vernal Pool.

Areas For Further Study

- Explore the properties for additional occurrences of priority communities, such as:
    - Circumneutral rock outcrops.
    - Patches of Hickory – Hop Hornbeam Forest and rich glades within the Oak Forest
    - vernal pools.

- Areas that should be explored better are: the main ridge slopes, North of the main ski slope, and in the upper elevations of the ridge; the wetlands North of Mountain Park Reservoir were not explored at all in 2003. Color ortho photos with countour lines can be very useful in identifying potential features.

- Try to understand the role of fire in the creation / maintenance of the Hickory – Hop Hornbeam Forest community, and of the open, rich forest glades. Consultation with regional experts might provide some answers. Some long term monitoring, particularly of future changes in the large, recent burn area North of the main ski slope, would also be valuable.
- Keep an eye out (in likely habitats and during flowering/fruiting periods) for possible populations of other rare plant species, which are known from East Mt, the Holyoke Range, Mt Tom, or city of Holyoke, and some of which may be present in the properties:
  - Wall-rue (Asplenium ruta-muraria)
  - Rounleaf Shadbush (Amelanchier sanguinea)
  - Nodding Chickweed (Cerastium nutans)
  - Lyre-leaved Rockcree (Arabis lyrata)
  - Midland Sedge (Carex mesochorea)
  - Violet Wood-sorrel (Oxalis violacea)
  - Shining Wedgegrass (Sphenopholis nitida)
  - Climbing fumitory (Adlumia fungosa)
  - Northern Arrowhead (Sagittaria cuneata)
  - Narrowleaf Verbena (Verbena simplex)
  - Hoplike Sedge (Carex lupuliformis)
  - Downy agrimony (Agrimonia pubescens)
  - Whorled Milkweed (Asclepias verticillata)
  - Philadelphia Panic-grass (Panicum philadelphicum)
  - Swamp Lousewort (Pedicularis lanceolata)
  - Autumn Coralroot (Corallorrhiza odontorhiza)
  - Houghton's Flatsedge (Cyperus houghtonii)
  - Culver's Root (Veronicastrum virginicum)
  - Toothcup (Rotala ramosior)
  - Tiny-flowered Sedge (Lipocarpha micrantha)
  - Upland Goldenrod (Solidago ptarmicoides)
  - Cornel-leaved Aster (Aster infirmus)
  - Bristly Buttercup (Ranunculus pensylvanicus)
  - Black Cohosh (Cimicifuga racemosa)

Invasives (details in invasives section)

- Swallowwort is by far the biggest concern and the highest priority for control measures. It is recommended that we control as much as we can as soon as we can.
- There are no large, dense patches of invasive shrubs, but they should be monitored. The most significant patches, particularly in the vicinity of rare plant populations, should be removed. Cut and paint method is less likely to disturb the herb layer than pulling.

Breeding Landbirds

A breeding landbird survey was conducted on Mt Tom in the spring of 2003. The survey protocols followed USFWS Wildlife Inventory and Monitoring Procedure for Landbird Breeding Survey. Thirty-eight points were established, with points on properties owned by MADCR, TTOR, HBGC, and USFWS. Points are at least 250 m apart, and are marked in the field with orange flagging and a metal tag affixed to a tree. The points are located in a variety of habitats (see map and table), with deciduous forest being most often represented (14 out of 38 points). In adherence with USFWS protocol, these points were surveyed four times (two replicates of two surveys). A third survey period was added in June (2 replicates) to ensure that the survey period did not pick up migrants (vs. breeders). Next year it is recommended that the third period be dropped.

A total of 75 species of birds were sighted on Mt. Tom, as shown in the table "Mt Tom Breeding Landbird Survey, 2003". Species in this table that do not have numbers were birds that were sighted (or heard) at times other than the bird survey.

An initial scouting survey conducted in May, 2003 revealed that a great diversity of migratory songbirds use Mt Tom for stopover habitat. Species sighted include Blackburnian Warbler, Black-throated Blue Warbler, Blue-winged Warbler, Northern Parula, and Yellow-rumped Warbler. None of these species were counted during the landbird breeding survey. It is recommended that an early migratory stopover study be conducted in 2004 to further assess the use of Mt Tom by neo-tropical migrants for stopover habitat, in addition to repeating the landbird breeding survey in 2004.

Mt Tom Breeding Landbird Survey, 2003

Species	# Points	# Individuals	Relative Abundance	Freq of Occurrence	NABCI BCR14	PIF	Mass.	Federal
American Crow	17	18	15.8%	14.9%				
American Goldfinch	38	50	43.9%	33.3%				
American Redstart	17	21	18.4%	14.9%	High			
American Robin	74	99	86.8%	64.9%				
American Woodcock					Highest	Priority (9)		
Bald Eagle					Moderate		Endangered	Threatened
Baltimore Oriole	27	29	25.4%	23.7%				
Black Vulture								
Black-and-white Warbler	23	23	20.2%	20.2%				
Black-capped Chickadee	15	17	14.9%	13.2%				
Blackburnian Warbler					Moderate	Priority (27)		
Blackpoll Warbler	1	1	0.9%	0.9%	Moderate		Sp. Concern	
Black-throated Blue Warbler					High	Priority (27)		
Black-throated Green Warbler	13	13	11.4%	11.4%	Moderate			
Blue Jay	34	40	35.1%	29.8%				
Blue-gray Gnatcatcher	2	2	1.8%	1.8%				
Blue-winged Warbler					High	Priority (9)		

Brown Thrasher	1	1	0.9%	0.9%			
Brown-headed Cowbird	25	25	21.9%	21.9%			
Canada Warbler					Highest Priority (27)		
Carolina Wren	1	1	0.9%	0.9%			
Cedar Waxwing	4	9	7.9%	3.5%			
Chestnut-sided Warbler	2	1	0.9%	1.8%	High Priority (27)		
Chimney Swift	3	3	2.6%	2.6%	High		
Chipping Sparrow	15	17	14.9%	13.2%			
Common Grackle							
Common Raven	1	2	1.8%	0.9%			
Common Yellowthroat	6	8	7.0%	5.3%			
Dark-eyed Junco	1	1	0.9%	0.9%			
Downy Woodpecker	5	5	4.4%	4.4%			
Eastern Kingbird	6	7	6.1%	5.3%			
Eastern Phoebe	2	3	2.6%	1.8%			
Eastern Towhee							
Eastern Wood-Pewee	33	34	29.8%	28.9%	High		
European Starling	7	13	11.4%	6.1%			
Field Sparrow	1	1	0.9%	0.9%			
Gray Catbird	12	13	11.4%	10.5%			
Great Blue Heron							
Great Crested Flycatcher	48	53	46.5%	42.1%			
Hairy Woodpecker	10	10	8.8%	8.8%			
Hermit Thrush	18	23	20.2%	15.8%			
House Finch							
House Sparrow							
Indigo Bunting	13	14	12.3%	11.4%			
Least Flycatcher	1	1	0.9%	0.9%			
Louisiana Waterthrush	1	1	0.9%	0.9%		Priority (9)	
Magnolia Warbler	1	1	0.9%	0.9%			
Mourning Dove	21	24	21.1%	18.4%			
Northern Cardinal	11	14	12.3%	9.6%			
Northern Flicker	18	19	16.7%	15.8%	Moderate		
Northern Mockingbird	7	7	6.1%	6.1%			
Northern Parula					Moderate		Threatened
Ovenbird	69	94	82.5%	60.5%	Moderate		
Pine Warbler	2	2	1.8%	1.8%			
Prairie Warbler						Priority (9)	
Purple Finch	1	1	0.9%	0.9%			
Red-bellied Woodpecker							
Red-eyed Vireo	75	130	114.0%	65.8%			
Red-tailed hawk							
Red-winged blackbird							
Rose-breasted Grosbeak	2	3	2.6%	1.8%	Moderate		
Rough-winged swallow							
Ruby-throated Hummingbird							
Ruffed Grouse	1	1	0.9%	0.9%			
Scarlet Tanager	47	54	47.4%	41.2%			
Song Sparrow	2	2	1.8%	1.8%			
Tree Swallow	1	1	0.9%	0.9%			

Tufted Titmouse	14	14	12.3%	12.3%		
Turkey Vulture						
Veery	13	15	13.2%	11.4%	High	
White-breasted Nuthatch	9	9	7.9%	7.9%		
Wild turkey						
Wood Thrush	27	37	32.5%	23.7%	Highest	Priority (9)
Worm-eating Warbler	1	1	0.9%	0.9%		Priority (9)
Yellow-rumped Warbler						
Yellow-throated Vireo	10	11	9.6%	8.8%		

75 species, total

Mt Tom Breeding Landbirds: Diversity by Habitat Type

Habitat Type	# Points
Cliff / talus	1
Deciduous	14
Deciduous wetland	1
Disturbed	2
Hemlock	1
Hickory / hop hornbeam	1
Mixed	9
Open / ski slopes	8
Red cedar	1

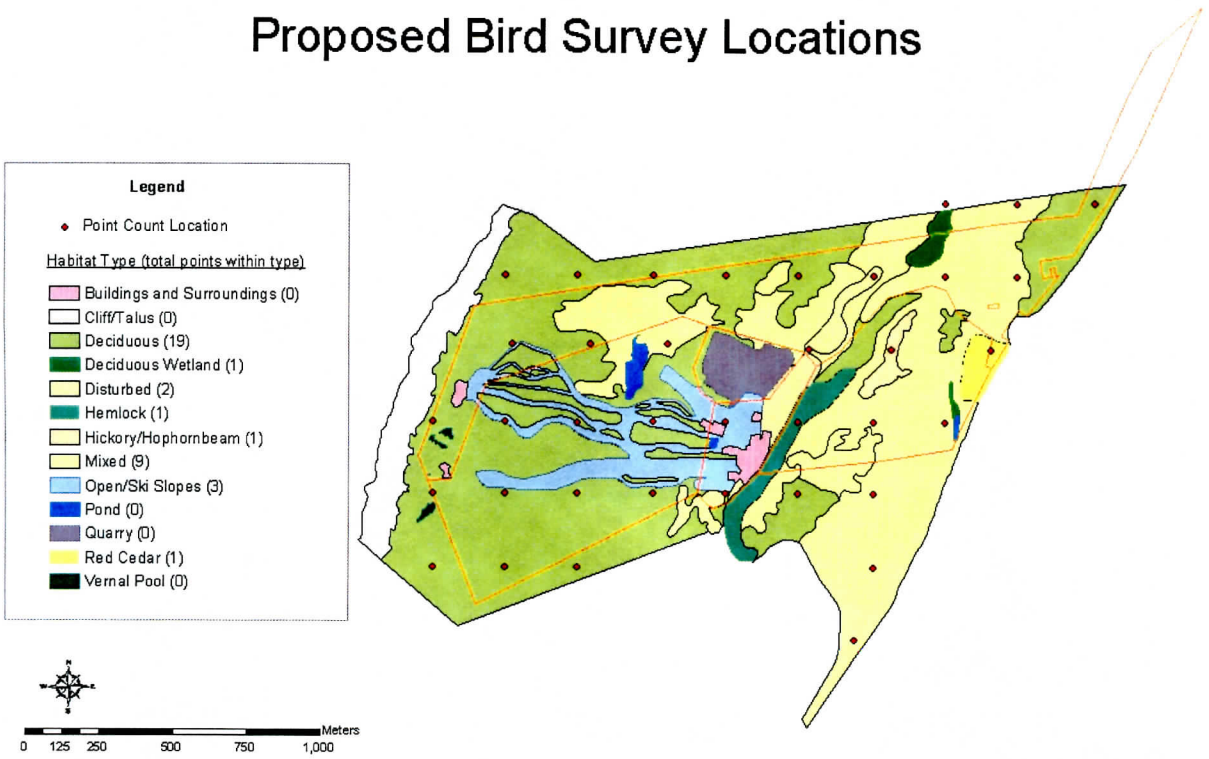
Point	# Spp	Habitat Type
BB01	10	Deciduous
BB02	11	Deciduous
BB03	16	Deciduous
BB04	13	Deciduous
BB05	8	Open / ski slopes
BB06	17	Open / ski slopes
BB07	16	Open / ski slopes
BB08	14	Deciduous
BB09	15	Deciduous
BB10	13	Deciduous
BB11	23	Open / ski slopes
BB12	14	Deciduous
BB13	12	Deciduous
BB14	19	Open / ski slopes
BB15	18	Open / ski slopes
BB16	12	Mixed
BB17	13	Deciduous
BB18	15	Open / ski slopes
BB19	18	Open / ski slopes
BB20	13	Deciduous
BB21	11	Deciduous
BB22	17	Hemlock

Point	# Spp	Habitat Type
BB11	23	Open / ski slopes
BB14	19	Open / ski slopes
BB38	19	Cliff / talus
BB15	18	Open / ski slopes
BB19	18	Open / ski slopes
BB30	18	Disturbed
BB06	17	Open / ski slopes
BB22	17	Hemlock
BB23	17	Disturbed
BB27	17	Mixed
BB03	16	Deciduous
BB07	16	Open / ski slopes
BB09	15	Deciduous
BB18	15	Open / ski slopes
BB25	15	Mixed
BB08	14	Deciduous
BB12	14	Deciduous
BB04	13	Deciduous
BB10	13	Deciduous
BB17	13	Deciduous
BB20	13	Deciduous
BB13	12	Deciduous

BB23	17	Disturbed
BB24	11	Deciduous
BB25	15	Mixed
BB26	10	Mixed
BB27	17	Mixed
BB28	9	Mixed
BB29	9	Hickory / hop hornbeam
BB30	18	Disturbed
BB31	9	Mixed
BB32	10	Mixed
BB33	10	Deciduous wetland
BB34	7	Red cedar
BB35	7	Mixed
BB36	8	Mixed
BB37	11	Deciduous
BB38	19	Cliff / talus

BB16	12	Mixed
BB02	11	Deciduous
BB21	11	Deciduous
BB24	11	Deciduous
BB37	11	Deciduous
BB01	10	Deciduous
BB26	10	Mixed
BB32	10	Mixed
BB33	10	Deciduous wetland
BB28	9	Mixed
BB29	9	Hickory / hop hornbeam
BB31	9	Mixed
BB05	8	Open / ski slopes
BB36	8	Mixed
BB34	7	Red cedar
BB35	7	Mixed

Proposed Bird Survey Locations



Reptiles and Amphibians

Given anecdotal evidence, available habitats, and historical records, it is likely that the entire area is used by northern copperheads and timber rattlesnakes. There is also the possibility of a few den sites (copperhead) on the properties. Because snake research in general is costly and time-intensive, it is recommended that for now we assume that the snakes could be anywhere, and develop outreach materials accordingly.

Vernal pool surveys were conducted on three days in April, 2003, with a number of highly skilled volunteers attending. Nineteen vernal pools were surveyed during the day, and three were surveyed at night specifically for marbled salamanders (see table). Additionally, four vernal pools were surveyed during three nights for calling anurans, per USFWS protocols. Nearly all vernal pools had spotted salamander egg masses. The vernal pool on top of Little Tom (VP8) had significant numbers of both spotted salamander and wood frog egg masses. Perhaps this is because it is the only vernal pool in a large area; the other vernal pools are more clustered.

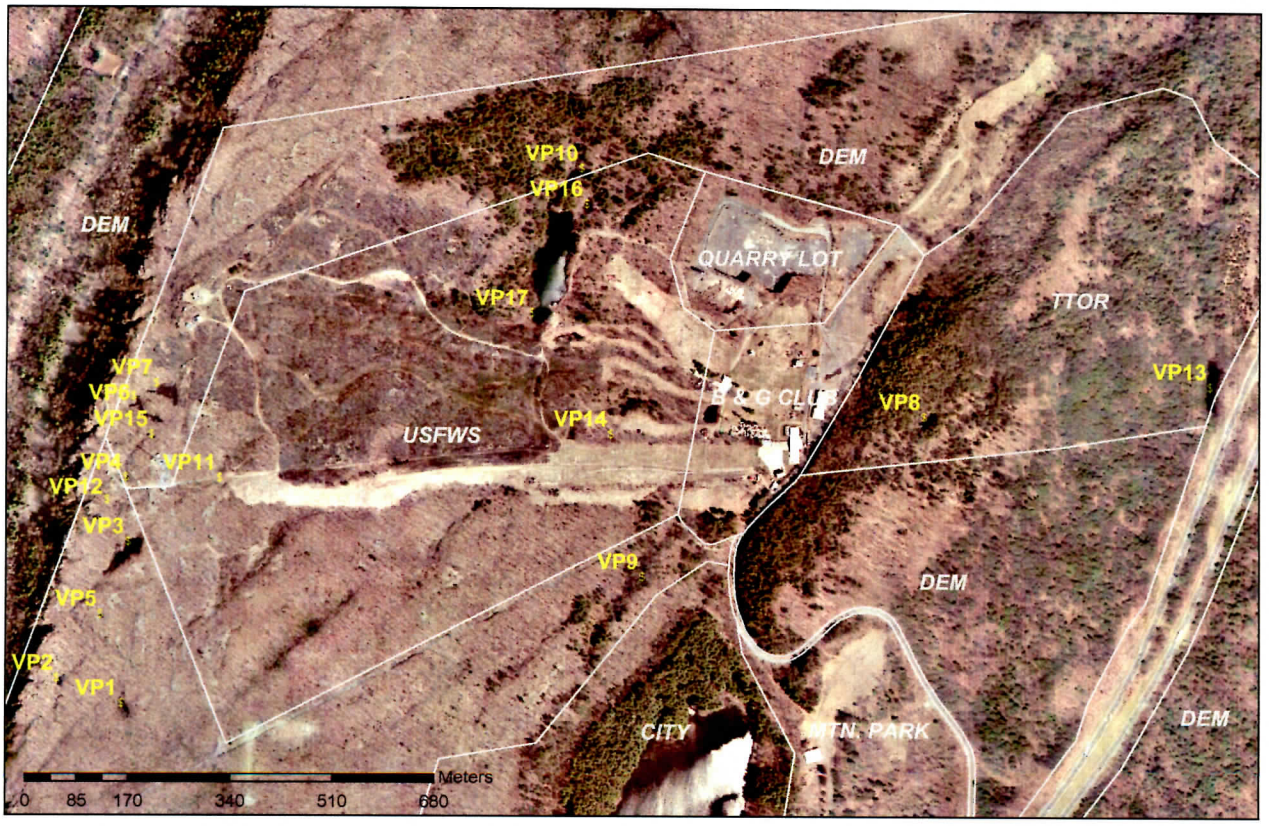
It is recommended that additional searches be conducted for vernal pools, particularly in the area along the ridge to the north of the wind tower, and in the forested wetland to the north of Mountain Park Reservoir.

Summary of Herpetological Data Collected for Mt Tom Vernal Pools, Spring, 2003

	Spotted salamander	Marbled salamander	Blue spotted salamander	Newt	Wood frog	Spring peepers	Green frog	Bull frog	Gray treefrog	American toad
VP1	X	X			X		X			
VP2	X				X					
VP3	X			X	X				X	
VP4	X				X					
VP5 (new)	X									
VP6* **	X		X (?)		X	X				X
VP7**	X				X					
VP8* ***	X			X	X	X	X	X		
VP9										
VP10	X									
VP11 (new)	X									
VP12	X									
VP13*	X			X		X	X	X		
VP14**	X									

VP15** (new)	X					X				
VP16	X									
VP17*	X			X				X	X	
Snowmaking small					X					
Snowmaking large*	X			X		X				X

* Surveyed at night for calling anurans
**Surveyed at night for marbled salamanders
*** VP8 had significant numbers of spotted salamander egg masses (424) and wood frog egg masses (121)



Invertebrates

Lynn C. Harper, Habitat Protection Specialist with the Massachusetts Natural Heritage & Endangered Species Program, graciously agreed to organize a few bio-blitzes to determine invertebrate occurrence on the Mt Tom properties. Below are her emails and species lists.

Mt. Tom Survey, June 21, 2003
The Athol Bird and Nature Club led an inventory of Odonata and Lepidoptera on Mt. Tom in Holyoke, Hampden County, Massachusetts, on June 21, 2003, from 0830 to about 1400, concentrating on Lake Bray in Mt. Tom State Reservation from 0830 to 0930, and then the lower parts of the former ski slopes for the rest of the time (the area now owned by DEM, USF&WS, TTOR, and the Holyoke Boys and Girls Club). Participants: David Small, Lynn Harper, Earle Baldwin, Susan Benoit, Jack Lash, Joanie McPhee, Max McPhee

Lake Bray

Odonates
- Elegant Spreadwing (*Lestes inaequalis*)
- Fragile Forktail (*Ischnura posita*)
- Eastern Forktail (*Ischnura verticalis*)
- Common Green Darner (*Anax junius*)
- Lancet Clubtail (*Gomphus exilis*)
- Common Baskettail (*Epitheca cynosura*)
- Prince Baskettail (*Epitheca princeps*)
- Eastern Pondhawk (*Erythemis simplicicollis*)
- Dot-tailed Whiteface (*Leucorrhinia intacta*)
- Chalk-fronted Skimmer (*Libellula julia*)
- Common Whitetail (*Libellula lydia*)

Lepids – none seen

Birds
- Great Blue Heron
- Green-backed Heron
- Belted Kingfisher
- Northern Flicker
- Pileated Woodpecker
- Northern Rough-winged Swallow
- Blue Jay
- American Crow
- Black-capped Chickadee
- Veery
- American Robin
- Warbling Vireo
- Red-eyed Vireo

Northern Cardinal
Chipping Sparrow
Red-winged Blackbird
Common Grackle
Northern Oriole
American Goldfinch

Other Vertebrates
Bullfrog
Pickerel Frog
Snapping Turtle
Painted Turtle
Musk Turtle
Northern Watersnake
Bluegill
Pumpkinseed
Largemouth Bass
Eastern Chipmunk

Ski Slopes

Odonates
Eastern Forktail (*Ischnura verticalis*)
Lancet Clubtail (*Gomphus exilis*)
Skillet Clubtail (*Gomphus ventricosus*, Species of Special Concern)
Southern Pygmy Clubtail (*Lanthus vernalis*, watch list)
Delta-spotted Spiketail (*Cordulegaster diastatops*)
Common Baskettail (*Epitheca cynosura*)
Calico Pennant (*Celithemis elisa*)
Chalk-fronted Skimmer (*Libellula julia*)
Widow Skimmer (*Libellula luctuosa*)
Common Whitetail (*Libellula lydia*)
Twelve-spotted Skimmer (*Libellula pulchella*)

Lepids
Eastern Tiger Swallowtail
Spicebush Swallowtail
Cabbage White
Clouded Sulphur
Pearl Crescent
Viceroy
Little Wood-Satyr
Common Ringlet
Silver-spotted Skipper
Hoary Edge
Dreamy Duskywing

Juvenal's Duskywing
Least Skipper
European Skipper
Long Dash
Hobomok Skipper
Common Roadside Skipper
8-spotted moth sp.
clear-winged sphinx sp.

Other Invertebrates
Six-spotted Tiger Beetle (*Cicindela sexguttata*)

Birds
Turkey Vulture
Killdeer
Mourning Dove
Eastern Wood-Pewee
Eastern Phoebe
Great Crested Flycatcher
Blue Jay
Common Raven
Black-capped Chickadee
Eastern Bluebird
Hermit Thrush
American Robin
Gray Catbird
Northern Mockingbird
European Starling
Prairie Warbler
Black-and-white Warbler
American Redstart
Ovenbird
Scarlet Tanager
Indigo Bunting
Song Sparrow
American Goldfinch
House Finch

Mammals
White-tailed Deer
Eastern Chipmunk
Gray Squirrel

Reptiles
Black Racer

Hi, everyone,

Attached is the list of what 12 of us saw on the former Mt. Tom ski area on 16 August 2003. We met at Lake Bray in the Reservation at 9 AM, but proceeded quickly to the ski area without covering Lake Bray in any depth. Starting at the former ski lodge, we hiked up to Mountain Park Reservoir, back down to the lodge, and then along the bunny slope north of the lodge to the stream off that slope's northeast end. Afterwards (by about 3 PM), we spent a short time at Whiting Street Reservoir before a thunderstorm moved in. We waited out the storm in a convenient Friendly's, while consuming our daily requirement of ice cream, and then five of us stopped quickly at TTOR's Dinosaur Footprints Reservation on the Connecticut River in Holyoke. The day wasn't particularly productive of rare species (one Special Concern and one watch listed ode, both off the ski area), but certainly fun nonetheless. Thanks to TTOR for the key to the ski area access road, thanks to Blair for coming all the way from the Cape, and thanks to all the participants!

Lynn

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Mt Tom and vicinity, Holyoke, MA 16 August 2003 – Blair Nikula, Lynn Harper, and 10 others

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Former Mt. Tom ski area:

Odonates

Lestes congener (Spotted Spreadwing) – a few
Lestes rectangularis (Slender Spreadwing) – a few
Enallagma ebrium (Marsh Bluet) – a few)
Enallagma geminatum (Skimming Bluet) – a few
Ischnura verticalis (Eastern Forktail) – a few
Anax junius (Common Green Darner) – a few
Celithemis elisa (Calico Skimmer) - common
Celithemis eponina (Halloween Pennant) – common
Libellula incesta (Slaty Skimmer) - common
Libellula luctuosa (Widow Skimmer) – common
Libellula lydia (Common Whitetail) – a few
Libellula pulchella (Twelve-spotted Skimmer) - common
Perithemis tenera (Eastern Amberwing) – a few

Sympetrum spp. (meadowhawk) - abundant; species identified included *S. internum* (Cherry-faced Meadowhawk), *S. semicinctum* (Band-winged Meadowhawk), and *S. vicinum* (Yellow-legged Meadowhawk)

Butterflies and Moths

Papilio glaucus (Eastern Tiger Swallowtail) – a few
Colias philodice (Clouded Sulphur) – a few
Colias eurytheme (Orange Sulphur) – a few
Celastrina ladona neglecta (Summer Azure) – a few
Everes comyntas (Eastern Tailed-Blue) – a few
Speyeria cybele (Great Spangled Fritillary) – a few
Phyciodes tharos (Pearl Crescent) - common
Nymphalis antiopa (Mourning Cloak) - one
Vanessa virginensis (American Lady) - one
Limenitis arthemis (Red-spotted Admiral) – one
Limenitis archippus (Viceroy) – a few
Megisto cymela (Little Wood Satyr) - one
Coenonympha tullia (Common Ringlet) - common
Cercyonis pegala (Common Wood Nymph) – a few
Danaus plexippus (Monarch) – a few
Hemaris thysbe (Hummingbird Clearwing) – a few

Other Insects

Sphecius speciosus (Cicada Killer Wasp) – a colony at the north end of the bunny slope
Dissosteira carolina (Carolina Locust) - abundant
Walking stick sp.
Cicada sp.
Katydid sp.
Antlion sp.

Birds

Turkey Vulture
Red-tailed Hawk
American Kestrel
Mourning Dove
Belted Kingfisher
Northern Flicker
Blue Jay
Cedar Waxwing
Rufous-sided Towhee

Reptiles and Amphibians

Pickerel Frog
Wood Frog
American Toad
Red-spotted Newt

Painted Turtle

Whiting Street Reservoir, Holyoke
Odonates
Enallagma carunculatum (Tule Bluet, Special Concern)
Dromogomphus spinosus (Black-shouldered Spinylegs)
Epitheca princeps (Prince Baskettail)
Libellula luctuosa (Widow Skimmer)
Pachydiplax longipennis (Blue Dasher)
Perithemis tenera (Eastern Amberwing)

Dinosaur Footprints Reservation, Trustees of Reservations, Connecticut River, Holyoke
Odonates
Hetaerina americana (American Rubyspot, watch list)
Argia moesta (Powdered Dancer)

Rare Plants / Priority Plant Communities

Methods
A botanical survey was conducted on Mt Tom from May through September of 2003. Prior to the field season, a list of target rare species and plant communities was developed by studying:

- rare species records for Mt Tom, the Holyoke Range, and East Mt;
- MANHESP fact sheets describing rare species and associated plant communities;
- UMASS Herbarium specimens;
- expected flowering and/or fruiting periods for each target species.

Aerial color ortho photos and topographic contours were studied in order to identify potential locations for rare species and plant communities, such as rock outcrops and rocky summits, talus slopes, contour discontinuities, and seepage areas.

Based on the target species, potential locations, and expected flowering/fruiting intervals, a field schedule was developed. The properties were explored on 18 dates from May into September, including a "Botanical Blitz" on 6/24/03 which enlisted 13 volunteers (with botanical skills ranging from regional experts to skilled NEPCop plant conservation volunteers).

MANHESP Rarity/Threat Designations
The plant community names used in this section are based on the names in MANHESP's "Classification of the Natural Communities of Massachusetts", with a few simplifications and approximations. MANHESP uses the "state rank" (SRANK) to indicate the level of rarity and threat of plant communities. SRANK values range from S1 through S5. Communities with

values of S1 through S3 are considered "priority" communities. The SRANK values are defined as follows:

- **S1** = Typically 5 or fewer occurrences in the state. Especially vulnerable to extirpation.
- **S2** = Typically 6-20 occurrences. Very vulnerable to extirpation.
- **S3** = Typically 21-100 occurrences, or limited acreage or miles of stream. Vulnerable.
- **S4** = Apparently secure in MA.
- **S5** = Demonstrably secure in MA.

For rare species, the level of rarity and threat in MA is given by the MANHESP designations: endangered, threatened, of special concern, or watch-list. .

Results

A total of 12 plant communities, of which 4 are MANHESP priority communities, were found in the properties. Of the 14 state-listed (endangered, threatened, or special concern) species for which MANHESP has recent, confirmed records on Mt Tom as a whole, the botanical survey on the new properties and immediate surroundings yielded 6 state-listed species, plus 6 watch-listed species, distributed in a total of 43 mapped populations (Red Pine and Butternut occur scattered in the properties and only a few populations have been mapped). Of these 43 populations, 39 were newly discovered in 2003. A complete plant species list for 2003 is yet to be compiled (and because of the focus of the 2003 survey on rare species and communities, this list will be missing many common plants).

The following plant communities have been identified. For each community, its SRANK and associated rare species which were found in that community are listed. **Priority communities** are shown in **bold**:

- **Hickory – Hop Hornbeam Forest (S2)**
  - Glauscescent Sedge (*Carex glaucodea*) – endangered

- **Circumneutral Rock Outcrop / Rocky Summit Community (S2S3)**
  - Green Rockcress (*Arabis missouriensis*) - threatened
  - Spiked False-oats (*Trisetum spicatum*) - endangered
  - New England Blazing Star (Liatris borealis) – special concern
  - Rock Spikemoss (Selaginella ruprestis) – watch list

- **Circumneutral Talus Forest (S3)**
  - Green Rockcress (*Arabis missouriensis*) - threatened
  - Purple clematis (*Clematis occidentalis*) – special concern

- **Woodland Vernal Pool (S3)**

- Oak Forest (S4) – including **richer pockets** due to seepage and/or contour discontinuities, where the following rare species were found:
  - Glauscescent Sedge (*Carex glaucodea*) – endangered - in rich glades near seeps

- Purple Twayblade (*Liparis liliifolia*) – watch list, about to change status - in a dry, rich, forest glade

- Acidic Rock Outcrop / Rocky Summit Community (S4)

- Northern Hardwoods – Hemlock – Oak Transitional Forest (S5)

- Non-woody Old Field – includes ski slopes
  - Violet Bush-clover (*Lespedeza violacea*) – watch list
  - Hoary Tick-trefoil (*Desmodium canescens*) – watch list

- Roadside / Disturbed Places
  - Large-bracted Tick-trefoil (*Desmodium cuspidatum*) – watch list
  - Violet Bush-clover (*Lespedeza violacea*) – watch list

- Red Cedar – Shrubby Old Field

- Permanent Pond / Reservoir

- Forest Swamp / Marsh Wetland – the unexplored wetlands North of Mountain Park Reservoir

The rare plant populations are distributed across the various properties as follows (for DCR populations, the first number is the total number of populations; the number in parenthesis is the number of populations on Little Tom. Red Pine and Butternut are found scattered in the properties.):

Species	MANHESP Status	USF&WS #Pop	DCR #Pop (#LT)	TTOR #Pop	B&G Club #Pop	Other #Pop	Total #Pop
Glauscescent Sedge (*Carex glaucodea*)	E	9	1				10
Spiked False-oats (*Trisetum spicatum*)	E		4				4
Green Rockcress (*Arabis missouriensis*)	T	2	11(7)	1	1	1	16
New England Blazing Star (*Liatris borealis*)	SC		2				2
Rock Spikemoss (*Selaginella ruprestis*)	SC	1	1(1)				2
Purple clematis (*Clematis occidentalis*)	SC		1(1)	2			3
Purple Twayblade (*Liparis liliifolia*)	WL		1(1)				1
Violet Bush-clover (*Lespedeza violacea*)	WL		2(1)				2

Species	MANHESP Status	USF&WS #Pop	DCR #Pop (#LT)	TTOR #Pop	B&G Club #Pop	Other #Pop	Total #Pop
Hoary Tick-trefoil (*Desmodium canescens*)	WL		2				2
Large-bracted Tick-trefoil (*Desmodium cuspidatum*)	WL		1(1)				1
Red Pine (*Pinus resinosa*)	WL						X
Butternut (Juglans cinerea)	WL						X
Totals:		12	26(12)	3	1	1	43

Invasives

An initial survey of invasive plants (funded by the USFWS Northeast Regional Office) focused on the abandoned ski slopes of Mt Tom. This survey revealed the following invasive species:

Asiatic bittersweet (*Celastrus orbiculatus*)
Autumn olive (*Elaeagnus umbellate*)
Black locust (*Robinia pseudoacacia*)
Climbing nightshade (*Solanum dulcamara*)
Glossy buckthorn (*Frangula alnus*)
Japanese barberry (*Berberis thunbergii*)
Common barberry (*Berberis vulgaris*)
Japanese honeysuckle (*Lonicera japonica*)
Japanese knotweed (*Polygonum cuspidatum*)
Multiflora rose (*Rosa multiflora*)
Pale swallowwort (*Vincetoxicum rossicum*)
Purple loosestrife (*Lythrum salicaria*)
Spotted knapweed (*Centaurea maculosa*)
Norway maple (*Acer platanoides*)
Northern catalpa (*Catalpa speciosa*)

It is recommended that these plants be managed as much as possible in 2004, particularly the one small patch of Japanese knotweed and the much larger invasion of pale swallowwort.

Swallowwort is found throughout the ski slopes, in the old field on the MADCR property, and around the I-91 vernal pool and rest stop on TTOR property (see map). A large seed source was discovered in two small (~6 acre) fields next to the I-91 rest stop (northbound). These fields are privately owned, and are currently for sale. It is recommended that we contact the landowner and ask permission to spray this field in 2004 or 2005. Farm Bill funding is a possibility for this effort. Additional information regarding the control of swallowwort on Mt Tom is presented below.

Estimated Costs to Control Swallowwort on Mt Tom

Area	Owner	Approximate Size (acres)	Estimated Infestation	Proposed method	Estimated Cost/acre	Estimated Total cost
Ski slopes	USFWS	45	50%	backpack	$200	$9,000
Billboard area, field, pond	TTOR	8	80%	backpack	$250	$2,000
Woods west of pond	TTOR	5	20%	backpack	$175	$875
Billboard area, field, woods	MADCR	7	80%	backpack	$250	$1,750
Woods west of rest area	MADCR	3	20%	backpack	$175	$525
Rest areas, medians, roadsides	MADOT	9	80%	backpack	$250	$2,250
Fields between I-91 and Rt 5	Private	8	100%	atv	$300	$2,400
		85			$1,600	$18,800

Background

Swallowwort is notoriously difficult to control. Manual and mechanical control methods are not very effective, as the stem tends to break easily above the root crown. The root crown itself is held tenaciously in place by a fibrous root system. If the entire root crown is not removed, the plant will readily re-sprout. Furthermore, the extracted root crowns must be removed from the site and destroyed, because any that are left on the ground will re-grow. Mowing presents the same re-sprouting problem as manual pulling. Fire is not effective in reducing populations of swallowwort (plants recover and reproduce as usual), and biological control options are currently not available.

Fortunately, a number of chemical control treatments are available, using the "over-the-counter" herbicides glyphosate (Round-Up) or triclopyr (Weed-B-Gone). Glyphosate is non-selective, whereas triclopyr preserves grasses and is recommended for Mt Tom. Studies (Lawlor 2000) show that foliar applications are superior to cut-stem applications (84% vs. 55% biomass reduction). Surfectants can be used to combat the plant's waxy leaf. Unfortunately, foliar sprays have no detectable impact on seedlings and juveniles that are present below the adult plants. In all cases, follow up treatments will be required, but should lessen considerably each year.

Recent research (Cappuccino 2003) shows that groups of less than 80 individual swallowwort plants (approximately 18" square) are not as likely to spread as rapidly as larger groups. Therefore, we should focus our chemical applications on these larger groups (at least initially). This greatly simplifies the question of whether to spray or not to spray in areas where there are many small groups of plants dotted across the landscape.

Ski Slopes (USFWS, ~45 acres)

The swallowwort infestation on the ski slopes is currently manageable, but likely to spread quickly because it is in the open. It is also the area most likely to be spreading its windblown seeds into uninfested areas. This is a high-priority area that should be treated beginning the 2004 growing season, and yearly thereafter. Each year the treatments will likely decrease in size as we control the infestation.

Billboard area and woods west of pond (TTOR, ~13 acres)

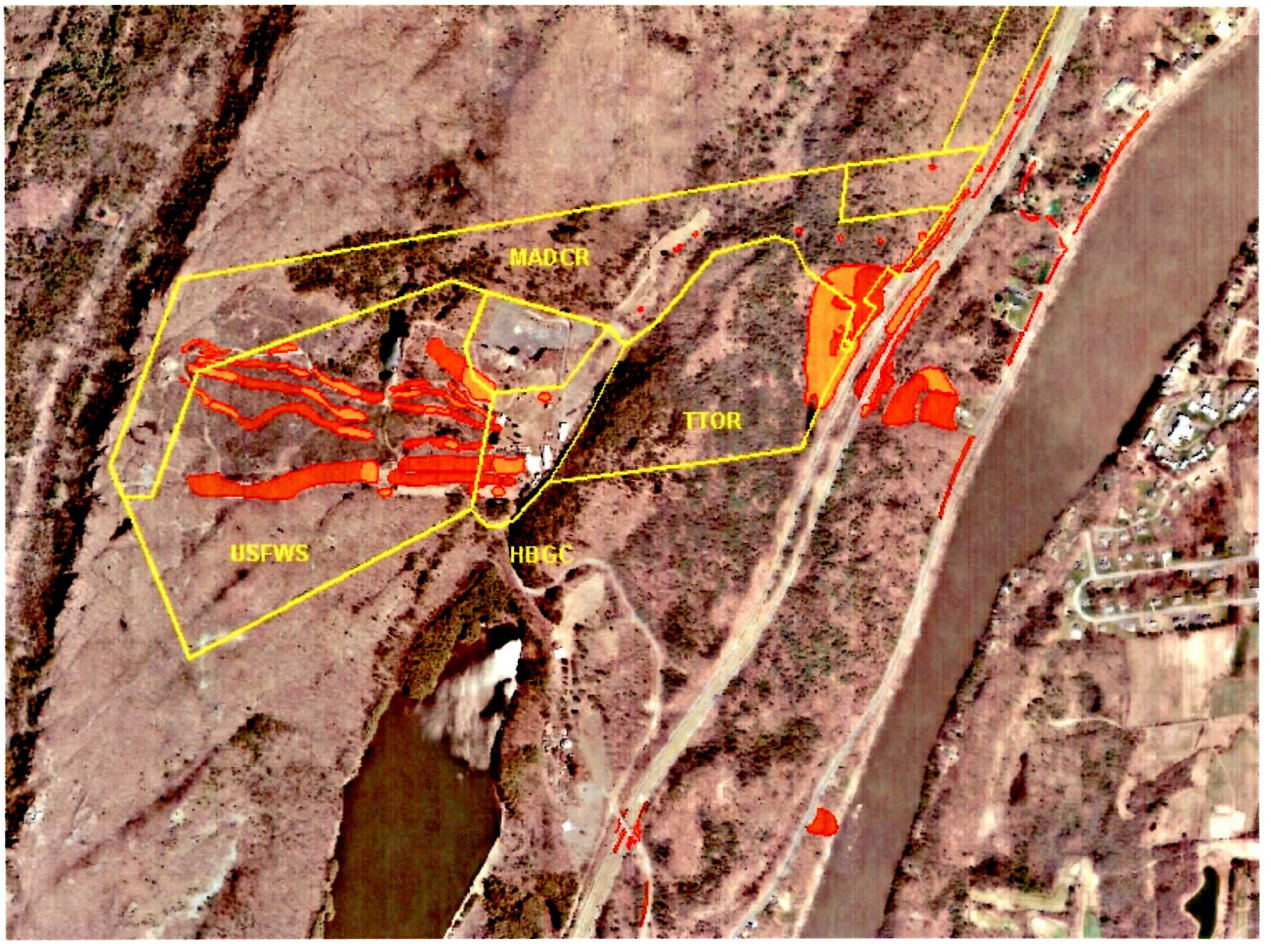
Part of this infestation is in an open field (~3-4 acres) and some is in the forest. The field should be prioritized and treated within the next 1-2 years, then followed up with close monitoring and additional annual treatments. Re-seeding in the field is a possibility, but there are no studies that address the impacts of re-seeding after chemical control of swallowwort. The forested areas should be treated within the next 2-3 years. There are no studies that address the effects of chemical treatments on shaded populations, but I expect that the forested areas can then be treated biannually.

Billboard area and woods west of rest area (MADCR)
The areas that are open should be prioritized and treated within the next year or two, and then yearly thereafter. Unforested areas that are at the edge of the population should be prioritized, to prevent further expansion. The areas that are in the forest can be treated within the next 2-3 years, and biannually thereafter.

Rest areas & roadsides (MADOT)
We should contact the Department of Transportation (MADOT) about treating this infestation within the next year or two, focusing on the two I-91 rest areas (~3-4 acres), where the infestation is concentrated. Individual plants and small clumps of plants are found along the road for less than a mile in either direction. These should also be treated, as they are probably distributing their seeds quite effectively along the highway corridor.

Fields (private)
These fields are probably the primary seed source for the Mt Tom area, and should be treated if we hope to lessen the Mt Tom infestation over time. The current owner should be contacted immediately and asked permission to spray their fields in the 2004 growing season. This property seems to be priced for a subdivision development, and it may be more difficult to obtain permission if the property is sold to a developer. NRCS can be contacted about funding opportunities. Because glyphosate leaches into ground water, we should consider the use of trichlopyr instead.

Below is a preliminary map of swallowwort occurrences in the Mt Tom area. Swallowwort was not found to the north or south of the map boundary. Area of greater densities of infestation are shown in red; lighter infestations are depicted in orange.



MA Natural Heritage Species Lists

The following information was provided by Lynn C. Harper, Habitat Protection Specialist, Massachusetts Natural Heritage & Endangered Species Program.

Mt. Tom as a whole:

Common Name	Scientific Name	State Status
Glaucescent Sedge*	*Carex glaucodea*	E
Violet Wood-sorrel	*Oxalis violacea*	E
Toothcup	*Rotala ramosior*	E
Wapato	*Sagittaria cuneata*	E
Spiked False-oats	*Trisetum spicatum* var. *molle*	E
Narrow-leaved Vervain	*Verbena simplex*	E
Hairy Agrimony	*Agrimonia pubescens*	T
Marbled Salamander*	*Ambystoma opacum*	T
Green Rock-cress*	*Arabis missouriensis*	T
Linear-leaved Milkweed	*Asclepias verticillata*	T
Wall-rue Spleenwort	*Asplenium ruta-muraria*	T
Orange Sallow Moth*	*Rhodoceia aurantiago*	T

Shining Wedgegrass	*Sphenopholis nitida*	T
Jefferson Salamander*	*Ambystoma jeffersonianum*	SC
Purple Clematis*	*Clematis occidentalis*	SC
Wood Turtle*	*Clemmys insculpta*	SC
Autumn Coralroot	*Corallorhiza odontorhiza*	SC
Spring Salamander	*Gyrinophilus porphyriticus*	SC
New England Blazing Star*	*Liatris scariosa* var. *novae-angliae*	SC
Eastern Box Turtle*	*Terrapene carolina*	SC

E – Endangered, T – Threatened, SC – Special Concern; * - on ski area, including the quarry parcel

You will note this does not include data-sensitive species, not because I don't want you to know what's there, but just because I'm being cautious. Additional species found on East Mountain (i.e., south of Rt. 141, as far the Pike) include:

Common Name	**Scientific Name**	**State Status**
New Jersey Tea Inchworm	*Apodrepanulatrix liberaria*	E
False Hop-sedge	*Carex lupuliformis*	E
Nodding Chickweed	*Cerastium nutans*	E
Cornel-leaved aster	*Doellingeria infirma*	E
Red Mulberry	*Morus rubra*	E
Swamp Lousewort	*Pedicularis lanceolata*	E
Climbing Fumitory	*Adlumia fungosa*	T
Dwarf Bulrush	*Lipocarpa micrantha*	T
Pine Barrens Zanclognatha	*Zanclognatha martha*	T
Black Maple	*Acer nigrum*	SC
Round-leafed Shadbush	*Amelanchier sanguinea*	SC
Four-toed Salamander	*Hemidactylium scutatum*	SC
Philadelphia Panic-grass	*Panicum philadelphicum*	SC

These additional species (above) could certainly be found on Mt. Tom, and some of them quite possibly on the ski area property as well.
Historically, Mt. Tom/East Mountain also supported these species below, and probably could support most of them again:

Common Name	**Scientific Name**	**State Status**
Peregrine Falcon	*Falco peregrinus*	E, fed. E
Bald Eagle	*Halieeatus leucocephalus*	E, fed. T
Lyre-leaved Rock-cress	*Arabis lyrata*	E
Boreal Wormwood	*Artemisia campestris* ssp.*borealis*	E
Ram's-head Lady's-slipper	*Cypripedium arietinum*	E
Pied-billed Grebe	*Podilymbus podiceps*	E
Sharp-shinned Hawk	*Accipiter striatus*	SC
Elderberry Long-horned Beetle	*Desmocerus palliatus*	SC
Bridle Shiner	*Notropis bifrenatus*	SC